

E  
17. (Thrice Amended) A non-naturally occurring composition of matter comprising a protein complex possessing nucleic acid polymerase enhancing activity, the complex comprising a plurality of subunits wherein at least one subunit is a *P. furiosus* protein selected from at least one of:

a protein encoded by a nucleic acid having the nucleotide sequence of SEQ ID NO: 70 or a nucleic acid that hybridizes to the complement of the nucleic acid having the nucleotide sequence of SEQ ID NO: 70, wherein the hybridization conditions comprise incubation in 5x SSC and 50% formamide at 42°C, and washing in 0.1x SSC and 0.1% sodium dodecyl sulfate at 60°C; and

a protein having a sequence of amino acids comprising the amino acid sequence of SEQ ID NO:71.

E<sup>2</sup>  
46. (Amended) An antibody that binds to a protein having an amino acid sequence comprising at least one of SEQ ID NO: 19 and 71.

E<sup>3</sup>  
59. (Thrice Amended) A protein produced from a cell containing a DNA construct comprising a sequence encoding the amino acid sequence of SEQ ID NO: 71 operably linked to an expression vector, wherein the protein is in monomeric, dimeric, or multimeric form.

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E<sup>4</sup>  
60. (Amended) The protein of claim 59, wherein the cell is a bacterial cell.

*4*  
*E*  
*cont*

61. (Amended) A polymerase-enhancing complex comprising the protein of claim 59.
62. (Amended) An antibody that binds to the protein of claim 59.
63. (Amended) An antibody that binds to a protein comprising the amino acid sequence of SEQ ID NO: 71, wherein the protein is part of the polymerase-enhancing complex of claim 61.
64. (Amended) The protein of claim 59, wherein the protein is produced as a fusion protein.
65. (Amended) The protein of claim 64, wherein the fusion protein comprises a calmodulin binding peptide.
66. (Amended) The protein of claim 65, wherein the expression vector is pCAL-n-EK.

*5*

77. (Amended) A non-naturally occurring composition of matter comprising a protein comprising the amino acid sequence of SEQ ID NO: 71.

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*ES*

78. (Amended) The composition of matter of claim 77, wherein the protein is in monomeric, dimeric, or multimeric form.

*ES*

79. (Amended) The composition of matter of claim 77, wherein the protein is present in a protein complex.

*ES*

80. (Amended) The composition of matter of claim 77, wherein the protein is an analog protein.

*E<sup>b</sup>*

85. (Twice Amended) A protein having polymerase-enhancing factor (PEF) activity comprising the amino acid sequence of SEQ ID NO: 73.

*E<sup>f</sup>*

90. (Amended) A protein extract of claim 87, which comprises a protein that can be bound by an antibody specific for a recombinant Pfu protein comprising the amino acid sequence of SEQ ID NO: 71.

*E<sup>g</sup>*

95. (Thrice Amended) A non-naturally occurring composition of matter comprising a polymerase-enhancing protein encoded by a nucleic acid that hybridizes to the complement of the nucleotide sequence of SEQ ID NO: 70, wherein the

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hybridization conditions comprise incubation in 5x SSC and 50% formamide at 42°C, and washing in 0.1x SSC and 0.1% sodium dodecyl sulfate at 60°C overnight.

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